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Semiconductor Subsidies? Tried and Failed

di T.J. Rodgers

I was the CEO of Cypress Semiconductor, a chip company founded in 1982 that peaked in 2018 at $2.8 billion in revenue and 5,846 employees. In 2020 German chip maker Infineon acquired us for $10 billion.

In 1987, the Semiconductor Industry Association decided that our industry needed to get on what I call welfare. The association lobbied Washington to fund a consortium called Sematech, grant it exemptions from antitrust laws, and fund a silicon-wafer fabrication plant. This was needed, the association said, because Japanese companies were about to wipe out the American semiconductor industry. As a chip company CEO, I never worried about getting wiped out, but I worried daily about rival memory chips from Hitachi, Toshiba, Mitsubishi and Fujitsu. That healthy competition made our company stronger, and in 2015 Cypress acquired Fujitsu's microcontroller team.

Before a 1987 congressional hearing on funding Sematech, Rep. Bob Walker (R., Pa.) called to ask if I would testify against funneling government dollars into the consortium. The semiconductor establishment, including Gordon Moore of Intel, testified for Sematech. My testimony that Sematech was a bad idea and that it would harm our industry landed me on the cover of BusinessWeek with the headline "The Bad Boy of Silicon Valley." Although I failed to stop Sematech from getting government funding, I testified three more times before Congress and managed to help prevent the public funding of another chip welfare program.

My mother was a fifth-grade teacher in Oshkosh, Wis. She earned $25,000 a year. Why should chip companies, some of the wealthiest corporations in the world, take money from her and other ordinary citizens? Today's massive $280 billion Chips and Science Act of 2022, the latest semiconductor welfare program, is even less justified than Sematech was.

Sematech was launched in 1987 in Austin, Texas, with $1 billion. Its board of 14 companies—including Intel, AT&T and Motorola—set the dues so high that my company couldn't afford to join. Its most harmful program related to next-generation chip-manufacturing equipment. In return for a one-year delay to market for all but its members, Sematech partially funded the development of next-generation chip-making equipment essential to survival in the Moore's Law race. (Moore's Law holds that the number of transistors on a single chip doubles every two years while the cost of manufacturing decreases.) This delayed-introduction scheme targeted Japan but also hurt Sematech nonmembers, including American chip companies like mine.

I found out about the equipment-holdback gambit when our engineers called me from a trade show, saying they had been denied access to a state-of-the-art silicon etcher that was sequestered in a private room. Sematech denied the secret-equipment claim, but later the tax assessor of Travis County, Texas, called me to ask if I thought Sematech was a charity. I sarcastically replied, "Yes, but not in the way you think," and said that I would need some documents to decide. The next day, there it was: a copy of a Sematech equipment holdback contract signed by Paul Castrucci, Sematech's chief operating officer. The U.S. government was paying for a one-year holdback, harming dozens of American chip companies.

Sematech's wafer-fabrication plant, built slowly because of politics, was already becoming obsolescent on the two-year Moore's Law clock. By comparison, in 2007 Cypress sold our aging original "Fab 1" 1983 plant for $53 million to a startup, Silicon Valley Technology Corp., to recycle our shareholders' funding. Sematech, which had moved its headquarters from Austin to Albany, N.Y., in 2007 to chase New York state subsidies, effectively gave away its Austin plant, which was double the size and a decade newer than our Fab 1. The $24 million price wasn't disclosed and was never paid in cash, just services.

To my knowledge, Sematech contributed nothing of note to U.S. semiconductor technology. Its Final Report in 1997 served up platitudes about "catching up with Japan" and fostering "industry cooperation."

Decades later, the Semiconductor Industry Association—now a group of lobbyists in Washington—began "saving" the chip industry again. This time the target is China, despite the fact that its best wafer foundry is SMIC, an also-ran in the foundry business. China is less a competitive threat today than Japan was in 1987.

In "The Wealth of Nations," Adam Smith championed free markets but warned that when businessmen gathered, within minutes their talk would turn to restricting markets. What if Smith's "bad guys" had $1 billion and an antitrust get-out-of-jail-free card at their disposal?

Advocates of the Chips and Science Act, which commits $280 billion in federal money to the semiconductor industry, say it's needed because the U.S. share of worldwide chip manufacturing (not revenue or market share) has dwindled to 8%. So, in a sense, Sematech succeeded in catching us up with Japan's 13% manufacturing share—by placing the U.S. near the bottom of the rankings. Today, most chips are made in South Korea (25%), Taiwan (22%) and China (22%). But the high-tech chips that separate winners from losers are made mostly in Taiwan and Korea, and Intel is a player.

The Semiconductor Industry Association's "save the industry" pitch is at odds with economic reality. Today's semiconductor companies are typically mature billion-dollar companies with aging foundry technologies that do nothing to differentiate companies or countries.

The way to judge a company's importance is by its market capitalization, here presented for the world's top 10 chip firms: Nvidia, valued at $3.4 trillion, does only chip design and has no internal foundry. Broadcom, valued at $1.2 trillion, is focused on design. Taiwan Semiconductor Manufacturing Co., valued at $1.024 trillion, only does foundry wafer making. Samsung, at $273 billion, is mixed use. AMD, at $190 billion, does design only. Texas Instruments, at $171 billion, is mixed use. Qualcomm, at $164 billion, does design only. ARM, at $136 billion, does design only. Analog Devices, at $108 billion, is mixed use. SK Hynix, at $104 billion, is mixed use. Intel, with a $86 billion market cap, is no longer in the top 10. Neither is the biggest Chinese foundry, SMIC, at $54 billion.

Clearly, Sematech didn't "save" the American chip industry. Intel, one of Sematech's founding members, was pushed out of top 10 not because of its manufacturing capability, but because the market no longer highly valued its aging personal computer chips. AMD trailed Intel for years but eventually overtook it, in part by taking share from Intel and in part by selling its foundries and focusing on design, an anti-Sematech strategy. Nvidia and Broadcom, neither of which joined Sematech or ever manufactured chips, are now No. 1 and No. 2 on the top 10 list, together worth more than the next eight companies combined. This tectonic shift happened because the government guessed wrong about who would win and who would lose.

Today, 100 high-performance computers can be put on one chip. The companies that know how to design 100-billion-transistor chips for a critical function such as artificial intelligence are much more valuable than the companies that carve commodity chips out of silicon wafers, like those in China. While the biggest chip-manufacturing company in China is worth $54 billion, a single U.S. chip company, Nvidia, is worth $3.4 trillion—58 times as much—and it doesn't even make its own chips. Why are we doing this again?

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